

Abstracts

Michael Kunzinger (Wien)

Some contributions of Michael Oberguggenberger to the theory of generalized functions

Michael Oberguggenberger is one of the founders of the theory of algebras of generalized functions, where his work has played a central role both in the theoretical foundations and in its applications. He has introduced new methods for treating singularities in a variety of fields and has thereby opened up a number of very fruitful lines of research, among others in analysis, geometry and stochastics. In this talk I will highlight some of his many contributions and sketch the ongoing developments that have resulted from his work.

Claudia Garetto (London)

Generalised pseudo- and Fourier integral operators

In this survey talk I will introduce the theory of generalised pseudo- and Fourier integral operators developed in collaboration with Michael Oberguggenberger in a series of papers. I will describe the main motivations, the applications to hyperbolic partial differential equations and the recent research inspired by this work.

Edoardo Patelli (Glasgow)

Efficient computational approaches for dealing with unknown and imprecision in engineering

Engineers are still facing challenges in design components, structures and systems that are safe and resilient to future threats but at the same time sustainable. A big challenge is to deal with unknown and uncontrollable variables such as changes on the environmental conditions, deliberated threats, change of intended use, etc. Methods for dealing with uncertainty usually assume a complete knowledge of the underlying model to represent uncertainty and often strong assumptions are made to overcome the knowledge gaps.

Imprecise probability allows to deal with lack of data and imprecision in a rigorous way. However, this is not largely adopted in practice. One of the main reasons is the lack of accessible and efficient tools, both analytical and numerical, for uncertainty quantification. On top, there exists still a lack of awareness of the potential capabilities of imprecise probability theory and its applications.

In this talk, current development of novel efficient algorithms for reliability analysis and uncertainty quantification and application of imprecise probability to practical engineering problems will be presented.